LDP

LIGHTING CONTROL TENDER PACKAGE

LIGHTING DESIGN PARTNERSHIP PTY LTD
213-217 PALMER STREET
DARLINGHURST
NSW 2010
AUSTRALIA

CSMVS Ancient Worlds

Mumbai, India

LDP 2538_953 v0 ISSUED ON 2023-08-10

LDP

CONTROL SYSTEM SPECIFICATION

Issued on 2023-08-10

1 PREAMBLE

This preamble is to be read in conjunction with all LDP documentation for the project and should specifically include the Control Schematic documents

The tenderer will **provide a detailed equipment schematic** with the bid to indicate the topology of the proposed package.

The tenderer will **provide a detailed listing of the equipment** with associated installed costs, including programming and commissioning.

2 GENERAL SYSTEM SPECIFICATION

The system will be based around a bus communication with an open-ended topology, allowing for future growth and modification.

The system will use **DALI** or other industry standard digitally addressable protocol as a backbone.

The system will be inclusive of all dedicated power supplies, accessories and interfaces required to achieve the operational specifications stipulated in the documentation.

The lighting control system will be designed to provide control on a zone topology. The system will allow the creation of master and unlimited nested sub-zones.

The system will allow monitoring and programming if required, via the Internet, allowing maintenance and reprogramming.

All items of equipment shall be fit for purpose and conform with the relevant Standards and Regulations in force locally.

All items shall be suitable for operation in ambient temperatures up to 40 degrees Centigrade with no degradation in performance.

All mains voltage equipment shall be suitable for operation on the local electrical power supply and shall be capable of operating normally on phase voltages between +10% and -6%. The tenderer will identify and state any exclusion to this requirement. All extra low voltage equipment will operate on a maximum of 24v DC.

The system must allow the addition and removal of components without requiring reprogramming of the entire system.

All equipment provided by the supplier shall be guaranteed for a period of not less than 24 months from the completion of commissioning. During the guarantee period, a repair or replacement service shall be provided for all items of equipment supplied, within a maximum period of 24 hours from notification of a fault.

The successful Tenderer must identify a minimum of three completed installations that are compliant with this Specification and if requested show the LDP/Design Team one completed installation that is to the LDP/Design Team's satisfaction.

3 CONTROL MODULES & MOUNTING RACKS

The Control Modules shall be able to accommodate the stated load types – Dimmed and Switch without any requirement for specific interface equipment.

The Control Modules will allow bidirectional interface with the selected BMS. Any interface units required to accomplish this will deemed to be included within this specification.

The Control Modules shall operate without creating any electrical harmonic disturbance on the input and output at any dimming level. Any filtering required to achieve this will be integral with the system as standard.

Any electrical harmonic disturbance caused by the control modules shall be within the limits specified in the relevant codes.

The minimum load for stable operation of any Control Module shall be 2% of the maximum rating. The switching module shall however be capable of being operated under no-load conditions without causing any damage to the components.

The switching racks shall be supplied fully wired and suitably labelled by permanent means. Final load circuits shall be labelled in accordance with the final load circuit designation as detailed in the contract documents.

The racks shall be in the form of wall mounted or free-standing enclosures, with segregated termination areas for mains and extra low voltage control wiring. Removable panels shall be provided to gain easy access to the termination areas for connection and servicing.

The racks shall be supplied with all the necessary control elements, to enable the operation of the system as specified.

The racks shall contain MCB protection for all modules and control elements with additional final circuit protection where specified. The MCB's shall be readily accessible, to enable them to be changed or added to on site if conditions change. The type of MCB used shall be selected to prevent nuisance tripping due to surge currents, when a load is switched to full on, whilst at the same time providing adequate protection.

The racks shall, at full rated loads, require no cooling fans and shall maintain the equipment contained therein at a safe operating temperature, in ambient temperatures up to 40 degrees Centigrade.

4 OUTLINE OF OPERATION

The lighting control method shall comprise one or more independent systems incorporating all elements identified within this specification.

The combined lighting control system shall provide dimming and switching control for the project as designed by LDP and detailed in the referenced documentation.

The operation of the lighting control system shall be based around the concept of stored lighting sequences, where a lighting sequence can comprise of a series of Scenes that use all or any of the independently controlled groups set to any programmed output level between 0 and 100%. Different fade times can be attributable to each sequence thus enabling smooth changes in lighting conditions to take place.

Each sub-zone will have the provision of selective access control for operations and programming.

Selective access will be established by passwords or other approved mechanisms.

The lighting control system shall provide different lighting sequences for the project, which once programmed, can be selected by one or more of the following means:

4.1 Via manual push button Scene Selection Panels located within the designated areas

4.2 Via an astronomical time-clock which shall be capable of providing timed commands in relation to sunrise/sunset for the site location

4.3 Via interactive touch screens located within the designated areas

4.4 Via wireless devices such as hand-held programmers, notebook computers, remote control pads

4.5 Other devices specific to the project and defined in related documentation.

5 SCENE LIGHTING OPERATION

Each Scene shall allow any group/channel to be independently addressed without affecting any other group/channel within that scene.

Each Scene shall be able to be assigned a fade time independent of any other Scene.

Each Scene shall be able to be linked to any other Scene with an attributed time delay.

Each Scene shall comprise any combination of control groups assigned an output between 0 and 100% independent of any other control group within any individual Scene.

6 SEQUENCE CONTROLLERS

Each sequence shall consist of any one of not less than 100 discrete intensity levels, plus "Off" for the dimmed channels, "On/Off" for the switched channels, assignable to each of the maximum number of control channels, a fade time from 0 to 600 seconds assigned to each scene and other assignable parameters necessary to provide the facilities described in this specification.

The assignment of levels for any or all control channels in each scene, and all other assignable parameters shall be either by a networked computer or hand-held programmer. Alternative methods restricting such assignments to one location, or requiring the manual setting of potentiometers or switches, or insertion of matrix pins shall not be acceptable. The system will include sufficient numbers of wired programming jacks or wireless connectivity to ensure that the programmer can program freely from any of the lit areas.

The system employed for assigning all data, as above, shall be made available to the LDP at no cost, with a commissioning engineer in attendance, to undertake initial set-up to the Client's satisfaction.

All assigned parameters shall be retained permanently in a non-volatile memory, without external power, up to a period of one month, and shall not be corrupted on a power-up or power-down of the equipment.

The System will provide a 'hard-copy' of the programmed memory onto removable media which can be retained. This hard copy will allow the system to be reprogrammed should the system memory become corrupted or destroyed.

The System shall incorporate a 'regain automatic control' feature as part of the timed settings which will automatically switch all scene selector panels back to the automatic mode.

7 DATA INPUTS

The Lighting Control System will be capable of accepting and processing multiple inputs as follows:

7.1 Astronomical Time clock with sunrise/sunset tables for the project location

7.2 Daylight sensor light level input with a range of at least 5-5000 lux with selectable step outputs

The system should allow the addition or deletion of inputs. For quantities of these sensors the tenderer will refer to the related documentation.

The clock must be synchronised over NTP with standard time servers.

8 EMERGENCY BACK-UP SYSTEM

The emergency back-up system shall provide a back-up lighting scene in the event of a failure in any of the central control elements.

The back-up scene shall not be dependent on any of the central control elements.

Upon restoration of normal operation, the Lighting Control System will automatically select the lighting scene, which would normally be prevailing at that time.

9 SCENE SELECTION PANELS

Scene Selection Panels (SSP) shall interconnect with the Sequence Controllers.

Scene Selection Panels will be of the following types:

9.1 Permanent Buttons – The finish will be as specified in the relevant documentation and will have control descriptions permanently marked via engraving or indelible printing on or adjacent to each button. Each panel may consist of 1 – 8 buttons.

9.2 Colour Touch Screen Panel - The finish will be as specified in the relevant documentation and will have displays configured to match user requirements via programming. The panel will use a full colour display of minimum 256 colours. For size of the panel the tenderer will refer to the related documentation. The minimum size will be 140mm x 230mm

10 EQUIPMENT SCHEDULE

All items shall be supplied by a single Integrator to form a complete, independent system. In addition, the Integrator shall include any other items necessary in order to ensure the correct operation of the systems in accordance with the specification. The Integrator shall be responsible for ensuring that the switching modules used are suitable for controlling the loads as specified.

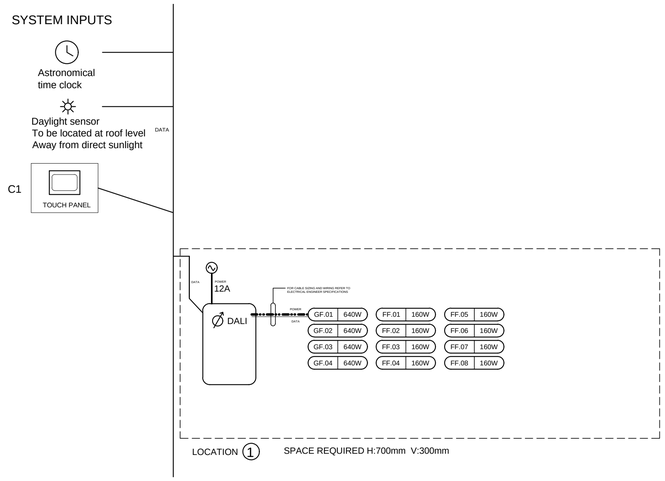
The system shall be capable of being expanded in terms of operational capacity via the addition of all necessary hardware and software enabling seamless operation and control of the expanded system, if so desired. The Tenderer shall advise of any manufacturing limitations imposed by his Tendered Product.

The selected Tenderer shall confirm all interconnecting cable requirements and suitability of cable routes with the contractor.

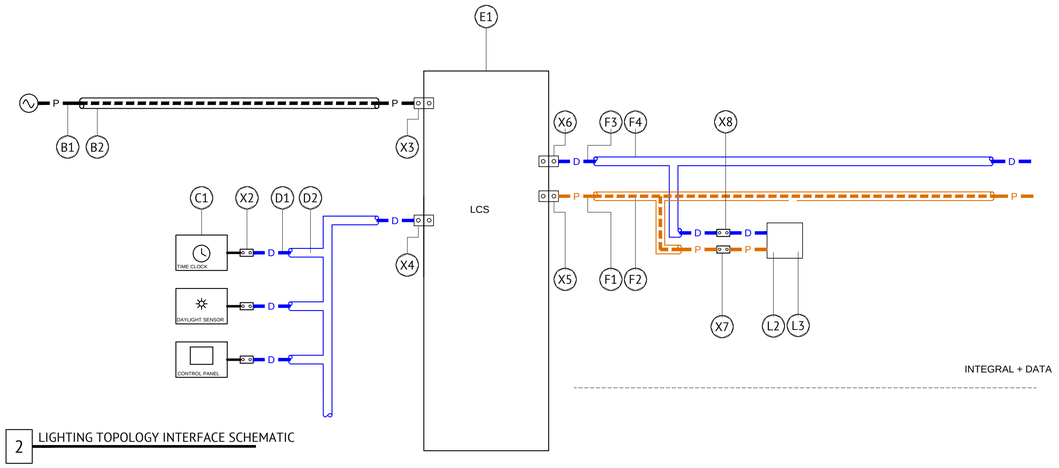
The Tenderer shall confirm that the cable routes and equipment locations chosen shall not result in any adverse interference, which shall affect the operation of the lighting control system or of any other equipment or cables in the vicinity.

The Tenderer shall fully commission the system after installation by the Electrical Contractor and demonstrate its correct operation in accordance with this specification, in the presence of the LDP.

Specialist sub-systems needed to fulfil the specification should be identified and described by the tenderer in full.



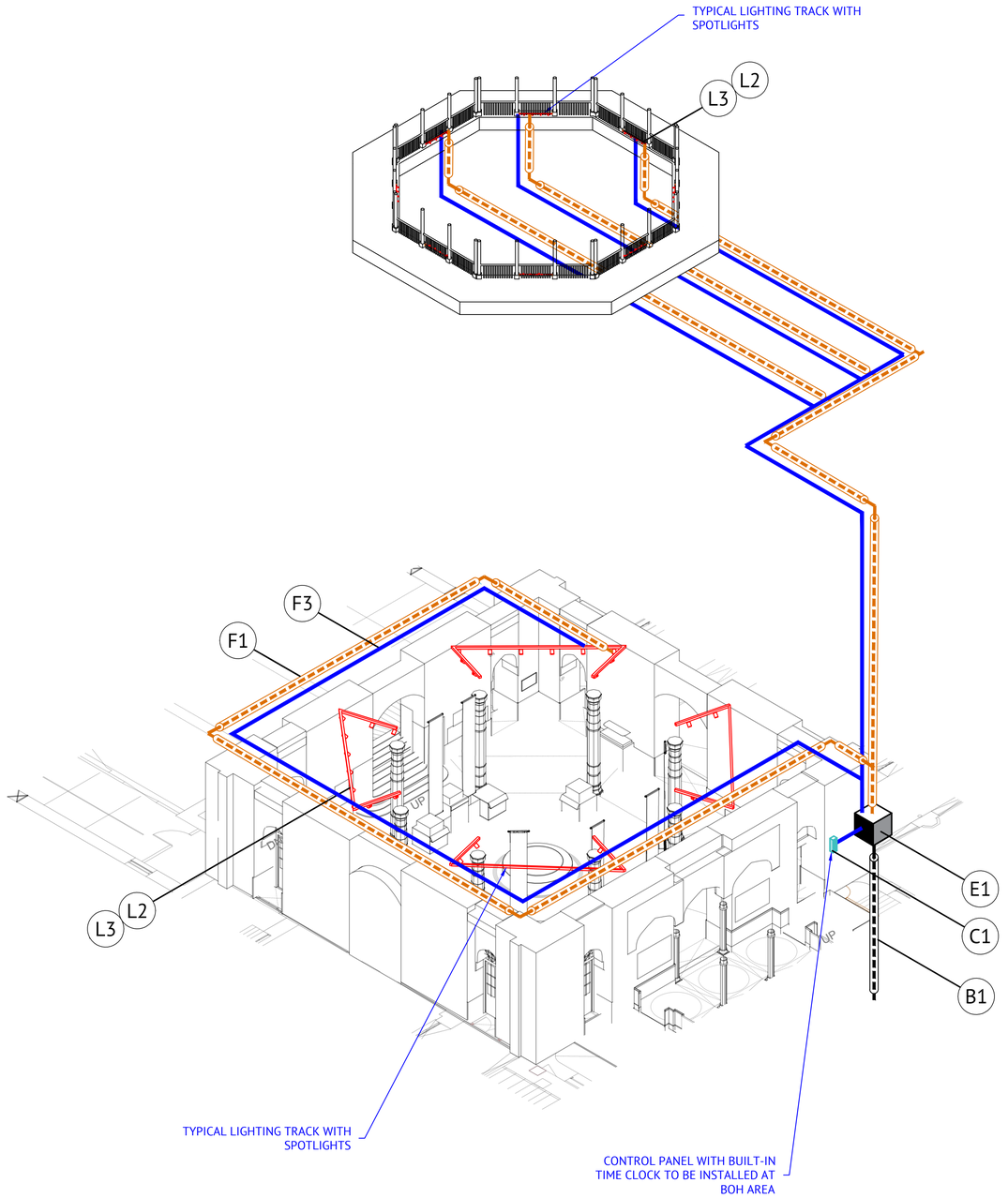
1 CONTROL HARDWARE SCHEMATIC



2 LIGHTING TOPOLOGY INTERFACE SCHEMATIC

Category	Item	Schematic Label	Description	Locate	Specify	Coordinate	Supply	Install	Test	Commission
Data Inputs	Input	C1	Lighting Control Input Device	LDP	LDP		CV	CV	CV	CV + LDP
	Interface	X2	Data termination at Input Panel					CV	CV	
	Reticulation	D1	Data Delivery	MEP	MEP		EC	EC	EC	EC
		D2	Containment	MEP	MEP		EC	EC		
	Interface	X4	Data termination at LCS					CV	CV	CV
Power Supply	Reticulation	B1	Power delivery to LCS	MEP	MEP		EC	EC	EC	EC
		B2	Containment	MEP	MEP		EC	EC		
Lighting Controller	Interface	X3	Power Termination at LCS					CV	CV	CV
		X4	Data Termination at LCS					CV	CV	CV
	LCS	E1	Lighting Control Racks	LDP	LDP	LDP + MEP	CV	CV	CV	CV
Integral + Data Luminaires	Interface	X5	Power termination at LCS					CV	CV	CV
		X6	Data termination at LCS					CV	CV	CV
	Reticulation	F1	Power delivery	MEP	MEP		EC	EC	EC	EC
		F2	Containment	MEP	MEP		EC	EC		
		F3	Data Delivery	MEP	MEP		EC	EC	EC	EC
		F4	Containment	MEP	MEP		EC	EC		
	Interface	X7	Power termination at Luminaire					LI	LI	LI
		X8	Data Termination at Luminaire					LI	LI	LI
	Lighting	L3	Luminaire	LDP	LDP		LV	LV / LI	LI	LDP + LI
		L2	Mounting	LDP	LDP	LDP + ?	LV / LI	LI	LI	

3 LIGHTING ACTIVITY RESPONSIBILITY MATRIX



LAYOUT NOTES:

REFER TO ARCHITECTS DRAWINGS FOR FINAL LIGHTING LAYOUTS

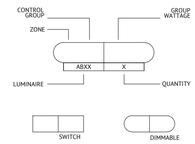
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT LIGHTING DESIGN PARTNERSHIP DETAIL DRAWINGS, LDP LUMINAIRE AND LIGHTING CONTROL SPECIFICATION AND VERIFIED AGAINST ARCHITECTURAL AND ELECTRICAL ENGINEERING DRAWINGS

THIS DRAWING IS INDICATIVE ONLY. REFER TO ARCHITECTURAL DRAWINGS FOR FINAL AREAS, LIGHTING LAYOUTS AND QUANTITIES

REFER ELECTRICAL ENGINEERING DRAWINGS AND SCHEDULES FOR CABLING, CIRCUITING, CONDUIT AND EMERGENCY LIGHTING INFORMATION

CONTROL CHANNELS SHOWN ARE INDICATIVE OF INTENDED GROUPINGS - REFER TO ELECTRICAL ENGINEERING DRAWINGS FOR FINAL CONTROL INFORMATION

CONTROL LEGEND



REV	NOTES	DATE
00	ORIGIN	2023-07-26
01	TENDER	2023-08-10

CONSULTANT

ODD WORKS
H No 33, Ground Floor, Block C 6,
Haus Khan Telephone Exchange
Safdarjung Development NT Area,
New Delhi, Delhi, India 110016

CLIENT

THE MUSEUM

Chhatrapati Shivaji Maharaj Vastu Sangrahalaya
159-161 Mahatma Gandhi Road,
Mumbai, Maharashtra 400001
T: +91 22 2284 4484

LDP
213-217 Palmer Street
Darlinghurst NSW 2010
Australia
T: +61 2 8353 5383
F: +61 2 8353 5399
W: www.LDP.net
LIGHTING DESIGN PARTNERSHIP Pty Ltd
ACN 069 070 757

PROJECT
AWG CSMVS, MUMBAI

DRAWING STAGE
DESIGN DOCUMENTATION

DRAWING
LIGHTING CONTROL
3D SCHEMATIC

DETAILS
LDP_2538_801.DWG PLOTTED BY KAIFENG LI ON 2023-08-10

SHEET SIZE
A1

REVISION
0

PROJECT & DRAWING NO
LDP_2538_802

BASE DRAWING REF: